Paper Reference 9MT0/41
Pearson Edexcel Level 3 GCE

Total Marks

Music Technology

Advanced

COMPONENT 4: Producing and Analysing

Time: 2 hours 15 minutes plus 10 minutes setting up time

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

X70773A

Pearson

YOU MUST HAVE

2022 Pearson audio/MIDI files, headphones or monitor speakers, digital audio workstation (DAW) and MIDI keyboard.

YOU WILL BE GIVEN

Diagram Booklet

SETTING UP TIME

Open a new project in your DAW using 16 bit/44·1kHz sample rate.

Save the project as 'comp4_your candidate number' (e.g. comp4_1234) in the folder designated by your centre.

Set the metronome to 75 bpm.

Import 'drums.wav' to a new track in your DAW, aligned with the beginning of bar 1.

Ensure that the drums are audible and play in time with the metronome. The drums begin at the start of bar 2.

You must not open the paper until instructed to do so by the invigilator.

INSTRUCTIONS

Answer ALL questions.

Answer the questions in the spaces provided in this Question Paper or on the separate diagrams – there may be more space than you need.

Save your audio files for Questions 1, 3, 4 and 5 within the 2 hour 15 minute examination time.

You must ensure that the left and right earpieces of your headphones are worn correctly.

Access to a calculator or calculator software is not permitted.

Access to the internet or local network is not permitted.

INFORMATION

The total mark for this paper is 105.

The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

There may be spare copies of some diagrams in case you need them.

ADVICE

Read each question carefully before you start to answer it.

Try to answer every question.

Check your answers if you have time at the end.

SECTION A

Answer ALL questions. Write your answers in the spaces provided.

Some questions are multiple choice. Write the letter(s) of your chosen answer(s) in the box(es) provided.

Question 1 is about the drum part.

1. Listen to the drums that you have imported.

   'drums.wav' is MIDI programmed.

   (a) Identify the type of drum kit.

   A 1980s drum machine

   B Jazz drum kit

   C Latin drum kit

   D Rock drum kit

   Answer ☐ (1 mark)

(continued on the next page)

1. continued.

(b) Identify the most appropriate quantise value for the hi–hat.

A 1/64

B 1/32

C 1/16

D 1/12

Answer ☐ (1 mark)

(continued on the next page)

1. continued.

Refer to the diagram for Question 1(c)(i) in the Diagram Booklet.

(c) (i) Draw the kick, clap, snare and cowbell part for bar 5 on the piano roll editor in the Diagram Booklet.
(4 marks)

(ii) When programming MIDI drums, state why the length of the notes makes no difference to the sound.
(1 mark)

(continued on the next page)

1. (c) continued.

(iii) Note velocity has a range of **0–127**. State how many bits MIDI uses to represent these values.

(1 mark)

(iv) All drum sounds have note velocity of **98**. Calculate the value of **98** in binary.

(1 mark)

(continued on the next page)

1. continued.

(d) In bars 15–19 of ‘drums.wav’ there is some distorted vocal.

(i) Identify the type of distortion added to the vocal.

A Bit crusher

B Hard clipping

C Soft clipping

D Valve guitar amplifier

Answer ☐ (1 mark)

(continued on the next page)

1. (d) continued.

(ii) Remove the distorted vocal whilst leaving the drum part unchanged.

(5 marks)

Bounce/export the completed drum part as a single 16 bit/44·1kHz stereo.wav file to the designated folder on your computer.

Name it 'q1_ your candidate number' (e.g. q1_1234).

(Total for Question 1 = 15 marks)

Question 2 is about the bass part.

2. Import ‘bass.wav’ to a new track in your DAW. The beginning of this audio track should be aligned with the start of bar 1. The bass begins at the start of bar 4.

   (a) Describe how this bass part would translate when playing back on an internal mobile phone speaker.
   (3 marks)

(continued on the next page)

2. continued.

(b) Explain why the envelope settings cause a click in bar 25.

(2 marks)

(Total for Question 2 = 5 marks)

Question 3 is about the piano part.

3. Import ‘piano.wav’ to a new track in your DAW. The beginning of this audio track should be aligned with the start of bar 1. The piano begins at the start of bar 4.

(a) The piano in bars 4–5 has three inserts.

(i) The first insert increases the piano’s sustain. Identify the processor.

A Chorus

B Compressor

C Reverb

D Tremolo

Answer [ ] (1 mark)

(continued on the next page)

3. (a) continued.

(ii) The second insert detunes the piano and gives the mono piano stereo width. Identify the processor.

A Chorus

B Compressor

C Reverb

D Tremolo

Answer ☐ (1 mark)

(continued on the next page)

3. (a) continued.

Refer to the diagram for Question 3(a)(iii) in the Diagram Booklet.

(iii) The third insert is distortion. The graph in the Diagram Booklet shows the waveform of piano before distortion in bar 4.

- **Label the axes.**
  (2 marks)

- **On top of the original waveform, draw the change in the waveform shape once distortion has been added.**
  (2 marks)

(continued on the next page)

3. continued.

(b) Recreate the same piano sound as bars **4–5** for the whole piano part.

(7 marks)

Bounce/export the completed piano part as a single 16 bit/44·1kHz stereo .wav file to the designated folder on your computer.

Name it 'q3_ your candidate number' (e.g. q3_1234).

(Total for Question 3 = 13 marks)

Question 4 is about the rap vocal and the scratch vocal.

4. Import ‘rap vocal.wav’ to a new track in your DAW. This track is the rap vocal part. Ensure that the beginning of this audio track is aligned with the start of bar 1. The vocal begins during the third beat of bar 3.

(a) Compression is used on the rap vocal.

(i) A compressor reduces dynamic range. Give a reason why the recording engineer compressed the rap vocal.
(1 mark)

(continued on the next page)

4. (a) continued.

(ii) State a disadvantage of compressing the rap vocal.

(1 mark)

_____

_____

(continued on the next page)

4. (a) continued.

Refer to the diagram for Question 4(a)(iii) in the Diagram Booklet.

(iii) The compression settings are:

- Threshold: -30dB
- Ratio: $10:1$
- Knee: hard
- Gain make–up: 10dB

On the graph in the Diagram Booklet:

- Label the units on the axes.
  (2 marks)

- Draw the response curve of the compressor.
  (5 marks)

(continued on the next page)

4. continued.

(b) The rap vocal was captured using a handheld microphone. A high shelf EQ boost was added.

Analyse the capture and how the characteristics of the recording have been affected by the EQ.

(8 marks)

Answer lines continue on the next two pages.

4. (b) continued.

4. (b) continued.

(continued on the next page)

4. continued.

(c) Import ‘break up with your girlfriend extract.wav’ to a new track in your DAW.
The file is an extract of ‘break up with your girlfriend, i’m bored’ by Ariana Grande. You should not use this whole file in your final mix.

(i) The file was downloaded from iTunes using AAC, and then converted to wav. State how the conversion from AAC to wav affects the file.

A File size is decreased.

B Sound quality is significantly improved.

C Sound quality is significantly reduced.

D There is no significant difference in sound quality.

Answer [ ] (1 mark)

(continued on the next page)

4. (c) continued.

(ii) The original tempo of ‘break up with your girlfriend, i’m bored’ was **85 bpm**. The tempo of ‘break up with your girlfriend extract.wav’ has been reduced to **75 bpm**. Identify the processor that has been used to decrease the tempo.

A Pitch correction

B Pitch shift

C Quantise

D Time stretch

Answer ☐ (1 mark)

(continued on the next page)

4. (c) continued.

(iii) Import 'scratch vocal example.wav' to a new track in your DAW. The file illustrates how bar 29 of the scratch vocal part should sound. You should not use this audio in your final mix.

Import the MIDI file 'scratch vocal.mid' to a new track in your DAW. Align the part so that the file begins playing at the start of bar 2.

(continued on the next page)

4. (c) (iii) continued.

Create a scratch vocal part.

- **Using ‘break up with your girlfriend extract.wav’, sample the sung phrase “You without me” ensuring that no other instruments are present.**

- **Use ‘scratch vocal.mid’ to trigger the sample.**

- **The sample must play the pitch and rhythm as illustrated in ‘scratch vocal example.wav’.**

- **Match the pitch bend range with ‘scratch vocal example.wav’.**

(9 marks)

(continued on the next page)

4. (c) continued.

Bounce/export the completed scratch vocal part as a single 16 bit/44·1kHz stereo .wav file to the designated folder on your computer.

Name it 'q4_ your candidate number' (e.g. q4_1234).

(Total for Question 4 = 28 marks)

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5. You should now have the following tracks in your DAW: drum, bass, piano, rap vocal and scratch vocal.

   (a) Remove the noise in bars 1–3 of the rap vocal.
   (2 marks)

   (b) Apply automated panning to the scratch vocal.

   - Only bars 20–21 should be affected; all other bars should be panned to the centre.
   - Bar 20 should be panned hard left.
   - Bar 21 should be panned hard right.

   (3 marks)

(continued on the next page)

5. continued.

(c) Gate the piano.

- Only bars 12–18 should be affected.
- The kick, snare and clap should trigger the side chain of the gate so that the piano plays in time with them.
- The hi–hat and cowbell should not trigger the side chain.

(3 marks)

(continued on the next page)

5. continued.

(d) Create a double tracked backing vocal for the phrases “stage fright” and “take flight” in bars 26 and 28.

- The words of the backing vocal should be the same as the lead vocal.
- Pan each backing vocal part hard left and hard right.
- Apply a short reverb to the backing vocals.
- Ensure that the lead vocal is still present in the centre.

(5 marks)

(e) Listen to the vocal delay in bar 11. Recreate the same delay on “message like” in bar 19.

(5 marks)

(continued on the next page)

5. continued.

(f) Balance the levels of the mix.

(3 marks)

(g) Produce a final stereo mix.

- Ensure that the mix output is at as high a level as possible.
- It should be free from distortion.
- Do not limit or compress the mix output.
- Ensure that the beginning and the end of the music are not cut off.
- Ensure that silences at the beginning and at the end do not exceed one second.

(3 marks)

(continued on the next page)

5. continued.

Bounce/export the completed mix as a single 16 bit/44.1kHz stereo .wav file to the designated folder on your computer.

Name it 'q5_ your candidate number' (e.g. q5_1234).

(Total for Question 5 = 24 marks)

TOTAL FOR SECTION A = 85 MARKS

SECTION B

Answer Question 6. Write your answer in the space provided.

6. Refer to the diagram for Question 6 in the Diagram Booklet. It shows a bass guitar pedal board. Evaluate the suitability of pedal settings for a funk bass guitar.

(20 marks)

Answer lines continue on the next six pages.

6. continued.

6. continued.

6. continued.

6. continued.

6. continued.

6. continued.

(Total for Question 6 = 20 marks)

TOTAL FOR SECTION B = 20 MARKS

TOTAL FOR PAPER = 105 MARKS

END OF PAPER